

***Kudoa sphyraeni* n.sp. (Myxosporidia : Protozoa) parasitic in the muscles of the gut of the marine fish, *Sphyraena jello* Cuv.**

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**Abstract.** A new histozoic myxosporidian, *Kudoa sphyraeni* n.sp., infecting the muscles of the gut of *Sphyraena jello* Cuv. (Fam: Sphyraenidae) is described.

**Keywords.** *Kudoa sphyraeni*; Myxosporidia; *Sphyraena jello*.

**1. Introduction**

During the course of an examination of the marine fish, *Sphyraena jello* Cuv. a myxosporidian parasite belonging to the genus *Kudoa* was found infecting the muscles of the gut wall, which is cosidered new and is described in the present paper.

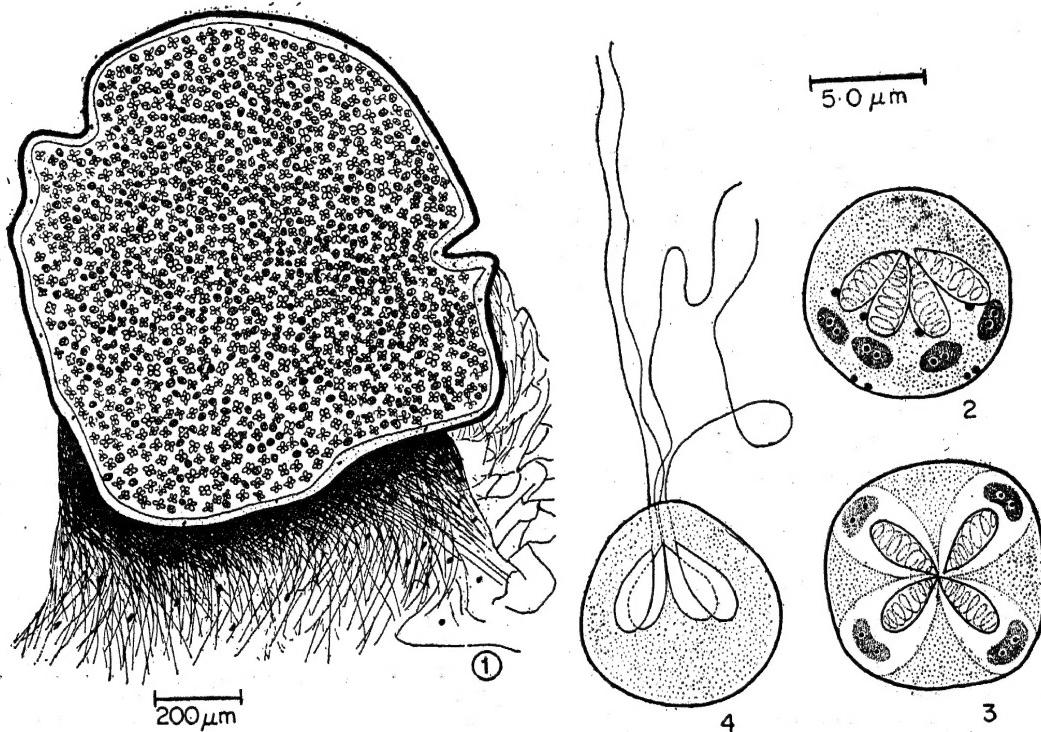
**2. Materials and methods**

The material for the present study was obtained from the commercial catches of the Offshore Fishing Station at Visakhapatnam, Andhra Pradesh and also from the fish landings at Bheemunipatnam about 20 miles further north. Smears were prepared from cysts of different sizes, fixed in acetone-free methyl alcohol and stained with Giemsa. Smears were also fixed in Schaudinn's fluid, hydrolysed in 1N HCl at 60° C for 10 min and stained with Heidenhain's iron haematoxylin or treated according to Feulgen's technique. Smears were also treated with PAS-light green and Azan stains. Spores were negatively stained with India ink to detect the presence of any mucous envelope. Spores were measured in the fresh condition and the range and mean of 25 spores is given. Drawings were made with the aid of a camera lucida and the measurements are given in microns ( $\mu\text{m}$ ).

**3. Observations**

A total number of 60 *Sphyraena jello* ranging in size from 15–40 cm and belonging to both sexes were examined during the period December 1972 to January 1977 and 4 of them were infected with a new species of *Kudoa*. There are no external

indications of infection but when present it is detected by the presence of a small opaque white pedunculate cysts ranging in diameter from 0·5–2·0 mm attached to the outer wall of the gut. The number of cysts in each of the 4 infected fish is 50, 42, 40 and 37 respectively. There is no correlation between the size of the fish and the number of cysts. The cyst was covered with a double wall enclosing a space in between which is filled with reticular material and a few deeply stained bodies. The outer collagenous layer is  $3\text{--}5 \mu\text{m}$  thick and the inner eosinophilic layer is  $2\text{--}3 \mu\text{m}$  thick. The pedunculate part of the cyst is made up of fibrous material with a few deeply stained bodies scattered all over, which are probably nuclei. The space inside the cyst is filled with numerous developmental stages of the spores in immature cysts and mature spores in the fully developed cysts (figure 1). Each pansporoblast gives rise to 2 spores. Mature spores are quadrate in polar view, broader than long and measured 9·4 (9·0–10·2) in length, 9·8 (9·5–10·5) in breadth and 9·8 (9·5–10·5) in thickness. The spore wall is very thin and ruptured very easily. The sutural lines are very faint. There is no mucous envelope for the spores. The polar capsules 4 in number are placed one in each of the 4 quadrants. They are club-shaped, equal in size and measured  $3\cdot6 \times 1\cdot0\text{--}1\cdot6$ . The polar filaments showed 7 turns (windings) inside the polar capsule and when fully everted range from 20–28  $\mu\text{m}$  in length and it is of uniform thickness. Two of the 4 filaments are straight while the other 2 are convoluted. In the majority of cases the polar filament in 2 of the polar capsules which are placed side by side is wound in a clockwise direction while in the other 2 polar capsules, also placed side by side, the polar filament is coiled in an anti-clockwise direction. It has not been possible to ascertain whether the coiling of the polar filament in the polar capsule has any



**Figures 1–4.** 1. T.S. cyst attached to gut wall. 2. Polar view of the spore. 3. Side view of the spore. 4. Spore with extruded polar filament.

bearing on the appearance of the filament when it is released. The sporoplasm is bean-shaped, binucleate and measured  $2.5 \times 1.5$ .

#### 4. Discussion

The genus *Kudoa* was established by Meglitsch (1947) for members belonging to the family Chloromyxidae (Myxosporidea) which are histozoic and whose spores are quadrate or stellate in polar view. He designated *K. clupeidae* (Hahn 1917) as the type species and transferred 8 species of *Chloromyxum* to the new genus created by him. Since then several species have been described from fishes from different parts of the world and all except *K. quadratum* (Thelohan 1895) Meglitsch 1947 (kidneys), *K. funduli* (Hahn 1915) Meglitsch 1947 (median fins), *K. branchiata* Joy 1972 (Gills) and *K. cerebralis* Paperna and Zwerner 1974 (brain and spinal cord) are from skeletal muscles.

The present form resembles *K. crumena* Iversen and Van Meter 1967 from the muscles of the spanish mackerel, *Scomberomorus maculatus*, collected in south Florida in the measurements of the spore but lacks the lateral processes. The polar capsules in the present form are smaller than in *K. crumena* and the polar filaments show only 7 windings inside the capsule and measure  $20-28 \mu\text{m}$  when fully everted in contrast to *K. crumena* where the polar filaments show several windings inside the capsule and when fully everted measure only  $15.5$  in length. Further the polar filaments in two of the four polar capsules are wound in a clockwise direction and in an anti-clockwise direction in the other two in the present form which appears to be unique for the present form. The present form also resembles *K. musculo-liquifasciatus* Matsumoto 1954 from the muscles of *Xiphias gladius* from Japan and *K. funduli* (Hahn 1915) Meglitsch 1947 from the median fins of *Fundulus heteroclitus* from New Jersey in the general appearance of the spore but the spores in the present form are consistently larger than the above mentioned species.

So far 2 species of *Kudoa* are reported from India. Tripathi (1952) reported *K. chilakensis* from the muscles of the peritoneum of oesophageal region of the freshwater fish, *Strongylura strongylura* and the spores are small in size measuring  $5.5 \times 7.2 \times 5.8$ . Narasimhamurti and Kalavati (1979) reported *K. tetraspora* from the tissues around the optic lobes of the estuarine fish, *Mugil cephalus*. The spores are quadrate and are characteristically arranged in groups of 4, and is reported from the muscles of the gut of the marine fish, *Sphyraena jello*. The spore measurements in the present form are nearly the same as in *K. tetraspora* but the site of infection is different and the characteristic spore arrangement is absent. In view of the reasons given above the present form is considered a new species and the name *Kudoa sphraeni* n.sp. after the host is proposed.

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